Systematic search for b-value anomalies in Japan

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Gutenberg-Richter b-values have been shown in case studies to be low prior to large earthquakes. However, a systematic study of b-values prior to large (>M6.5) earthquakes for a entire region has never been conducted. We systematically investigate the spatio-temporal evolution of b-values using a data-driven approach. Using the Japan Meteorological Agency (JMA) earthquake catalog, we explore b-values prior to major crustal earthquakes with M>6.5 in Japan that occurred during a 15 year period (late 2001 to late 2016). We calculated b-values in three dimensionally distributed grids using a parameter search (selection radius, time periods, etc.). We search for the appearance of b-value anomalies associated with large-magnitude earthquakes to develop a data-driven anomaly definition. These results will be used in designing a final model submitted to the Collaboratory for the Study of Earthquake Predictability (CSEP), Japan for testing.

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